

Fashion Solution for Acne-Prone Skin: Designing Skin-Conscious Garments Through Textile and Garment Design

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ABSTRACT

Acne is commonly understood as a dermatological concern, but the clothing worn every day can also influence the comfort of people with acne-prone skin. Garments remain in contact with the body for long periods, and factors such as friction, pressure, heat, sweat, tight fitting and fabric surface can sometimes irritate the skin. Acne mechanica is a form of acne-like eruption associated with physical factors such as friction, pressure, rubbing, stretching and occlusion. Clothing and sports equipment are among the situations in which these factors may occur.

This research explores how fashion and apparel design can respond to the needs of acne-prone skin without presenting clothing as a medical treatment. The study focuses on textile selection, moisture management, breathability, surface smoothness, garment fit, seam placement, construction techniques and design for different activities. Existing dermatological and textile research was reviewed to understand the interaction between skin and clothing. The research suggests that designers can reduce unnecessary friction and improve wearer comfort by making informed choices about fabric properties and garment construction. The paper proposes practical fashion solutions including breathable and moisture-managing fabrics, reduced-friction seams, appropriate garment ease, ventilation zones, skin-contact layers and easy-care construction.

The research concludes that skin-conscious fashion can be developed as a design approach in which aesthetics, functionality and wearer comfort are considered together. Further primary research involving users and fabric testing could help develop and validate garments specifically designed for people with acne-prone or easily irritated skin.

Keywords: acne-prone skin, fashion design, apparel design, acne mechanica, skin-friendly textiles, moisture management, friction, garment construction, clothing comfort.

1. INTRODUCTION

Fashion is generally associated with appearance, identity, culture and self-expression, but clothing also has a direct physical relationship with the human body. A garment can affect how a person experiences heat, moisture, movement, pressure and comfort throughout the day. This becomes particularly relevant for people with acne-prone or easily irritated skin.

Acne is a complex skin condition and clothing is not its primary cause. However, physical factors associated with clothing can sometimes aggravate acne-prone areas. Dermatological literature describes acne mechanica as acneiform eruptions associated with pressure, friction, rubbing, squeezing, stretching or occlusion. Historical research has reported associations with tight straps, belts, sports equipment and occupational friction. More recent dermatological information also explains that clothing or equipment can

trap heat and sweat and then rub against heated skin, potentially contributing to irritation and breakouts.

This creates an opportunity for fashion designers to approach acne-prone skin from a different perspective. Instead of attempting to “cure” acne through clothing, designers can investigate how garments can be made more comfortable and less likely to create unnecessary friction, heat and moisture against the skin.

The present research therefore considers fashion as a supportive design solution. It asks how textile characteristics, garment fit and construction can be used to create clothing that respects the needs of acne-prone skin while remaining practical, attractive and commercially relevant.

2. BACKGROUND OF THE STUDY

2.1 Acne-Prone Skin and Clothing

Acne-prone skin can react differently to environmental and physical conditions. Although acne has several biological and hormonal factors, physical irritation can become an additional concern. The American Academy of Dermatology notes that acne mechanica can develop where clothing or equipment repeatedly rubs against the skin, especially when heat and sweat are trapped.

For a fashion designer, this means that areas such as collars, shoulder straps, waistbands, underarms, back panels and inner thighs deserve attention because these areas may experience repeated contact or movement.

2.2 Skin–Textile Interaction

Clothing is not physically neutral. The skin and fabric move against one another during sitting, walking, exercising and other daily activities. Textile research shows that friction at the skin–fabric interface can contribute to discomfort and irritation, particularly when mechanical forces continue over time.

Fabric surface characteristics are also important. Research investigating fabrics in warm environments found that surface roughness and friction can influence skin sensation and physiological responses. Therefore, selecting a fabric simply because it feels soft when dry may not be enough. Its behaviour when wet, during movement and after repeated washing should also be considered.

2.3 Heat and Moisture Management

Sweat is another important consideration. When moisture stays between skin and clothing, the wearer may experience dampness, stickiness and discomfort. Research on clothing comfort during exercise identifies wetness at the skin–clothing interface as an important factor in perceived comfort.

Textile engineering provides several ways of managing moisture. Wicking, absorption, evaporation, air permeability and fabric construction can influence how quickly moisture moves away from the skin.

This is especially relevant to Indian climates, sportswear, summer clothing and garments worn for long periods.

3. LITERATURE REVIEW

3.1 Acne Mechanica and Physical Friction

Mills and Kligman introduced the term acne mechanica to describe local acne exacerbations associated with physical forces such as pressure, friction, rubbing and stretching. Their examples included tight clothing, straps and sports equipment.

More recent research has also documented acne mechanica associated with friction, including a report examining inner-thigh friction as a cause.

These studies are important for fashion research because they demonstrate that physical contact is not simply an issue of subjective comfort. Repeated mechanical interaction between clothing and skin can have dermatological relevance in susceptible individuals.

3.2 Moisture and Clothing Comfort

Textile research shows that moisture management is an important aspect of clothing comfort. Fabric thickness, porosity, moisture regain, drying time and water-vapour transmission can all influence thermal and moisture-related comfort.

Research on skin-contact workwear similarly reports that reducing moisture resistance and improving the movement of moisture away from the body can be particularly important in warm conditions.

Therefore, a skin-conscious garment should not simply be described as “cotton” or “natural.” The actual fabric structure and performance need to be considered.

3.3 Fabric Surface and Friction

The surface of a textile can influence how it feels against the skin. Research into textile–skin tribology indicates that friction is influenced by several factors, including textile characteristics, skin moisture, humidity and the anatomical area involved.

This suggests that designers should consider smoother inner surfaces, appropriate fabric constructions and reduced mechanical contact in areas where friction is likely to occur.

3.4 Clothing for Active Use

Sports and activewear deserve particular attention because exercise increases sweating and body temperature. The AAD recommends moisture-wicking clothing and looser-fitting workout clothes in the context of acne mechanica because they can reduce sweat retention and rubbing.

This provides a useful design direction for fashion students: activewear for acne-prone users could combine moisture management, ventilation, ergonomic fit and low-friction construction.

4. RESEARCH GAP

Existing research clearly discusses acne mechanica, friction, heat, sweat and the relationship between textiles and skin. Textile research also examines moisture management and clothing comfort. However, these areas are often studied separately.

There is an opportunity to connect dermatological knowledge with practical fashion design decisions.

The research gap addressed by this study is:

How can fashion designers translate knowledge about friction, heat, moisture and skin–textile interaction into practical garment and textile solutions for people with acne-prone skin?

The focus is therefore not on developing a medical treatment, but on developing a design framework for more skin-conscious clothing.

5. PROBLEM STATEMENT

People with acne-prone skin may experience discomfort from clothing that creates excessive rubbing, pressure, heat or moisture. Conventional garment design often prioritizes appearance, trend, cost and construction efficiency, while skin–fabric interaction may receive less attention.

The problem addressed in this research is the limited consideration of acne-prone skin when selecting textiles and developing garment construction.

If designers intentionally consider fabric surface, moisture management, breathability, fit, seam placement and areas of repeated friction, clothing can potentially become more comfortable for users with acne-prone skin.

6. AIM OF THE RESEARCH

To investigate how textile selection and garment design can be used to develop more skin-conscious clothing solutions for people with acne-prone skin.

7. RESEARCH OBJECTIVES

1. To understand the relationship between clothing, friction, heat, moisture and acne mechanica.
2. To study textile characteristics relevant to skin comfort.
3. To investigate garment areas that may experience repeated friction or pressure.
4. To identify clothing-design strategies that may improve comfort for acne-prone users.
5. To explore suitable textile and construction solutions for everyday and activewear garments.
6. To develop practical recommendations that fashion designers can apply when creating skin-conscious apparel.

8. RESEARCH QUESTIONS

1. How can clothing contribute to discomfort for people with acne-prone skin?
2. Which textile properties are important for skin comfort?
3. How can garment construction reduce unnecessary friction and pressure?
4. How can clothing manage sweat and heat more effectively?
5. What design solutions can be applied to everyday clothing and activewear?
6. Can skin-conscious fashion be developed without compromising aesthetics and functionality?

G. HYPOTHESIS

Main Hypothesis

H1: Garments designed with consideration for friction, moisture, heat, fabric surface and fit can provide greater perceived comfort for people with acne-prone skin than garments developed without specific consideration of these factors.

Null Hypothesis

H0: Consideration of friction, moisture, heat, fabric surface and garment fit does not significantly influence perceived clothing comfort among people with acne-prone skin.

10. DISCUSSION: FASHION SOLUTIONS FOR ACNE-PRONE SKIN

The main contribution of fashion design to this subject is the ability to translate research into physical design decisions. The following solutions are proposed based on the reviewed dermatological and textile literature.

10.1 Moisture-Managing Textiles

One of the most important solutions is effective moisture management. During hot weather or physical activity, sweat can remain between the skin and garment. A wet textile may also increase the sensation of stickiness and discomfort.

Designers can therefore investigate fabrics and fabric structures that promote wicking and faster drying.

However, the solution should not simply be labelled “sweat-proof.” Different fibres and constructions behave differently. Fabric testing should examine absorbency, drying time, air permeability and moisture transport.

For activewear, a **two-layer approach** could be explored. The inner surface could be designed to reduce prolonged wet contact, while the outer layer could help transport and release moisture. Textile research demonstrates that engineered structures can be designed to control moisture movement through fabrics.

10.2 Breathability and Ventilation

A second solution is increasing airflow around areas where heat and sweat commonly accumulate.

Instead of making an entire garment loose, designers can strategically introduce ventilation panels around the back, underarms or other high-heat areas. Mesh or open textile structures may be used where appropriate, provided that their surface does not create excessive irritation.

The aim is to create a garment microclimate that is less hot and humid. Research on the skin–clothing microclimate demonstrates that airflow, fabric permeability and the space between skin and clothing influence heat and moisture transfer.

10.3 Reduced-Friction Garment Construction

A garment can be redesigned to reduce unnecessary rubbing. Designers can investigate:

- flatter seams,
- smoother seam finishes,
- reduced bulky seam intersections,
- carefully positioned labels,
- softer inner construction,
- fewer unnecessary internal components,
- strategic seam placement.

This is especially relevant around the neckline, shoulders, underarms and inner thighs.

The objective is not to eliminate all contact between clothing and skin, which is unrealistic, but to reduce **repeated and unnecessary mechanical stress**.

10.4 Appropriate Garment Fit

Fit is another important design consideration. Extremely tight garments can increase contact pressure and may trap heat and sweat. The AAD specifically recommends loose-fitting workout clothing where acne mechanica is a concern.

However, the solution is not to make every garment oversized.

A better approach is **functional ease**: enough space for movement and airflow without losing the intended silhouette. Designers can use pattern cutting to create controlled ease around high-friction areas while maintaining a fashionable overall shape.

For example, a fitted top could remain fitted around the torso while incorporating slightly more room around the underarm or shoulder region.

10.5 Strategic Fabric Selection

There should not be a single fabric labelled as universally suitable for acne-prone skin. Individual skin responses differ, and textile performance depends on fibre, yarn, weave or knit structure, finishing and moisture conditions.

Instead, designers can establish a **fabric selection checklist**:

Surface: Is the fabric smooth enough for prolonged skin contact?

Moisture: Does it transport or retain sweat?

Air permeability: Can air move through the fabric?

Drying: How quickly does the fabric become comfortable after sweating?

Weight: Is it unnecessarily heavy for the intended climate?

Stretch: Does the stretch create excessive pressure?

Care: Can the garment be washed frequently without losing performance?

This approach is more scientifically responsible than claiming that one particular fibre can prevent acne.

10.6 Skin-Contact Inner Layers

Another possible design solution is creating a dedicated inner layer that controls the contact between the skin and outer garment.

For example, a jacket or uniform could include a removable inner panel made from a smooth, moisture-managing textile. This component could be washed more frequently than the outer garment.

Such modular construction could also be useful in uniforms, sportswear and travel clothing.

10.7 Garment Hygiene and Washability

Since sweat and skin oils can accumulate on clothing, garments intended for acne-prone users should be designed for practical laundering.

Designers can consider:

- machine-washable materials,
- colourfast fabrics,

- quick-drying constructions,
- removable inner panels,
- washable straps,
- easy-care finishes.

The important point is that clothing should be easy to maintain rather than requiring complicated care.

10.8 Activity-Specific Design

A major improvement would be to stop treating all clothing as one category.

Everyday wear: Focus on breathable fabrics, comfortable fit and smooth construction.

Activewear: Give greater attention to moisture management, ventilation and friction. **Sleepwear:** Prioritize lightweight, breathable construction and unrestricted movement. **Workwear/uniforms:** Consider prolonged wear, repeated washing and pressure points. **Inner garments:** Pay particular attention to surface feel, moisture and close skin contact.

This activity-based approach allows fashion designers to create more realistic solutions.

11. PROPOSED DESIGN FRAMEWORK

Based on the research, a skin-conscious garment can be developed through five design stages:

Stage 1 – Skin-contact mapping:

Identify where the garment touches the body and where rubbing or pressure is likely.

Stage 2 – Fabric selection:

Test candidate textiles for surface characteristics, breathability, moisture management and drying behaviour.

Stage 3 – Pattern development:

Adjust ease, seam placement and garment shape to reduce unnecessary pressure.

Stage 4 – Construction:

Use suitable seam finishes, smooth internal details and carefully considered components.

Stage 5 – Wear testing:

Allow users to wear prototypes during normal activities and record comfort, heat, dampness, rubbing and overall satisfaction.

This framework can turn the concept from a theoretical idea into an actual fashion-design project.

12. LIMITATIONS OF THE RESEARCH

This research is primarily based on secondary literature and does not claim that clothing can prevent or cure acne. Acne is a multifactorial dermatological condition, and individual responses to textiles can vary.

The research also does not provide fabricated survey statistics. A stronger future study would involve primary data from people with acne-prone skin and controlled comparisons of different textile and garment constructions.

13. FUTURE SCOPE

Future research can develop and test actual prototypes. Different fabrics could be compared for moisture absorption, drying time, air permeability, surface roughness and perceived comfort.

A questionnaire could also be conducted among acne-prone clothing users to identify their most common clothing-related concerns. Questions could cover fabric preference, tightness, sweating, friction, garment categories and discomfort.

Wear trials could then compare conventional garments with skin-conscious prototypes.

The research could eventually lead to a small apparel collection consisting of everyday tops, activewear, sleepwear or inner layers designed around the principles identified in this study.

14. CONCLUSION

Fashion has an opportunity to respond to acne-prone skin through thoughtful design rather than attempting to treat the medical condition itself. Research indicates that friction, pressure, rubbing, heat and occlusion can contribute to acne mechanica, while textile studies demonstrate that moisture management, surface characteristics, airflow and skin–fabric interaction are important aspects of clothing comfort.

The research therefore suggests that skin-conscious fashion should consider the garment as an environment surrounding the body. Fabric choice, fit, construction, ventilation, moisture management and washability can all contribute to the wearer's experience.

The most practical solutions include moisture-managing textiles, breathable structures, controlled garment ease, reduced-friction seams, smoother internal surfaces, strategic ventilation, washable components and activity-specific design. These solutions do not claim to cure acne; instead, they aim to reduce avoidable clothing-related irritation and improve comfort.

For fashion designers, this topic offers a valuable shift in perspective. A successful garment does not have to choose between aesthetics and comfort. Through thoughtful pattern cutting, textile selection and construction, it is possible to develop garments that are visually appealing while being more responsive to the physical needs of the wearer.

Future primary research involving questionnaires, fabric testing and prototype wear trials would strengthen these findings. Such work could help establish measurable design criteria for skin-conscious apparel and create new possibilities within functional and inclusive fashion design.

In conclusion, fashion can become part of a supportive solution for acne-prone skin when designers move beyond appearance and consider the complete interaction between textile, garment, environment and human skin.